UNITED STATES DISTRICT COURT
DISTRICT OF NEVADA

LaKISHA NEAL-LOMAX, *et al.*,	)	
	)	
Plaintiffs,	)	
	)	
vs.	)	Cause No. CV-S-05-01464-PMP-RJJ
	)	
LAS VEGAS METROPOLITAN POLICE DEPARTMENT, *et al.*,	)	
	)	
	)	
Defendants.	)	

DECLARATION OF JEFFREY D. HO, M.D.

I, Jeffrey D. Ho, state the following:

1. My name is Jeffrey D. Ho.

2. I am a competent adult and have personal knowledge of the following facts.

3. Attached hereto are true and accurate copies of my expert reports in the *Lomax, et al . v. Las Vegas Metropolitan Police Department, et al.* litigation. My opinions are expressed to a reasonable degree of medical certainty.

4. I affirm under penalties of perjury that the foregoing statements are true.

Date: 1-8-08

Jeffrey D. Ho, M.D.

STATE OF Minnesota)
)
COUNTY OF Hennepin)

Before me the undersigned, a Notary Public in and for said County and State, personally appeared Jeffrey D. Ho, who acknowledged the execution of the foregoing instrument as of this 8 day of January, 2008.

Chicago
County of Residence

1-31-2010
My Commission Expires

Notary Public

Tanya Reed
Printed

INDS02 MCR 922671v1

United States District Court
District of Nevada

LaKisha Neal-Lomax,
Joshua William Lomax,
Aliaya Tierraee Lomax, and
Joyce Charleston, individually
and as Special Administrator of the
Estate of William D. Lomax, Jr.

Case: A513602

Plaintiffs,

v.

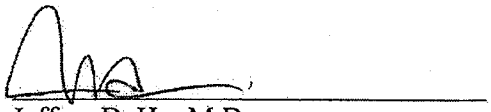
EXPERT REPORT
Jeffrey D. Ho, M.D.

Las Vegas Metropolitan Police Department;
Officer Reggie Rader, in his individual and official
capacity; Sheriff Bill Young in his official
capacity; TASER International, Inc., an Arizona
Corporation; TASER International, Inc., a Delaware
Foreign Corporation; DOES I through X; Does XI
Through XX; and ROE CORPORATIONS XXI Through
XXX, inclusive,

Defendants.

Jeffrey D. Ho, M.D.
Minneapolis, MN
612-873-4904

Pusuant to Fed. R.Civ.P. 26(a)(2), I, Jeffrey D. Ho, hereby submit my report that contains a complete statement of all opinions to be expressed and the bases and reasons therefore; the data and other information I considered in forming the opinions; the exhibits or list of references I used as a summary of or support for the opinions; my qualifications, including a list of all publications authored within the preceding ten years; the compensation to be paid for the study and testimony; and a listing of any other cases in which I have testified as an expert at trial or by deposition within the preceding four years.

Signed: 
Jeffrey D. Ho, M.D.

Date: April 13, 2007

April 13, 2007

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Case: Lomax v. Las Vegas Metropolitan Police Department, et al (A513602).

***Introduction**

I have been retained as an expert medical consultant on behalf of the Defendant, TASER International, Inc. (TASER) in the above-referenced case. I have been asked to provide my opinions about: (1) the effects of the electrical output from TASER® electronic control device (ECD) on a person's ability to breathe, (2) the effects of the electrical output from a TASER ECD on a person's blood chemistry, including, but not limited to acidosis.

I reserve the right to supplement or modify this statement if and when I acquire additional relevant information prior to the time of trial.

***Qualifications**:

I am a practicing, residency trained and board-certified emergency medicine physician and a licensed peace officer in the state of Minnesota and hold an academic appointment at the University of Minnesota Medical School. I have previous experience as a firefighter/EMT and have fellowship training specifically in the area of EMS/pre-hospital emergency care. I have 9 years of reserve military service and I currently serve as a medical director to several EMS agencies in the upper Midwest. I am also an expert medical research consultant on in-custody death issues to TASER International and

maintain certification as a TASER Instructor. My area of expertise includes research in the area of sudden and unexpected death in law-enforcement custody and also the physiologic effects of non-lethal electronic control devices (ECD). I have conducted numerous research studies on these devices and have been published in peer-reviewed medical journals and have presented at national/international meetings and assemblies on these topics. My opinions in this case are based on the above qualifications. In addition to these qualifications, I will refer interested persons to my attached CV for further qualifications and information.

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***Publications in the last 10 years**:

Please refer to my curriculum vitae for a listing of publications.

***Compensation**:

Billed at a rate of $300.00 per hour for time spent actively working on this case (reviewing, writing, testifying, providing deposition) regardless of location.

Billed at a rate of $300.00 per hour during business hours (8a-5p) and $150.00 per hour during non-business hours (5p-8a) for travel time spent away from home for purposes of this case.

Travel expenses are to be reimbursed.

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***Previous testimony or deposition as an expert within the last 4 years:**

1. Giannetti v. City of Stillwater, OK (August, 2005; expert for the defense, civil wrongful death case)
2. United States of America v. Jason Malone (July, 2005; expert for the plaintiff, criminal use of force case)
3. Walker v. City of Edina, MN (August, 2004; expert for the defense, civil wrongful death case)

***Reviewed Documents**

I have reviewed the following documents in preparing this report:

1. The Inquest of William Lomax, June 25, 2004
2. Valley Hospital Medical Records for Mr. Lomax
3. American Medical Response EMS Run Sheet
4. X26 TASER Downloaded data for #X00-010761
5. Clark County Coroner's Report
6. Report by Plaintiff's Expert Dr. Jerry W. Bush
7. Report by Plaintiff's Expert Dr. Jared Strote
8. Report by Plaintiff's Expert Dr. Brett H. Woodard
9. Report by Plaintiff's Expert Dr. Mark A. Rhodes
10. Report by Plaintiff's Expert Mr. David M. Ingebretsen
11. Deposition of LVMPD Officer Reggie Rader
12. Video clip of LVMPD Officer Reggie Rader showing area of ECD application
13. Statements and testimony by EMS personnel Pearson and Ritz

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Exhibits

The exhibits or list of references used as a summary of or support for the opinions in this report and which may be used at deposition and/or trial specifically include, but are not limited to, video of 10 second TASER ECD application during an ultrasound**; video of 15 second TASER ECD application during breathing measurement**; and data, reports, and papers listed or referenced herein.

***Case Summary:**

These are the facts of the case that I consider relevant in forming my opinion. Mr. William Lomax was under the influence of an illegal hallucinogen (PCP) on the day of his death. On February 20, 2004, Mr. Lomax was noted to be behaving in an irrational and bizarre manner (described as walking in circles, attempting to undress, etc.) while on the premises of an apartment complex where he had been previously sent away from and warned not to return under the trespass statute. Security officers on the scene attempted to stop Mr. Lomax and recognized that he was not acting correctly and called for EMS after recognizing that he was probably under the influence of some type of illicit drug. At some point, a Las Vegas Metropolitan Police officer also stopped to assist with detaining Mr. Lomax. Mr. Lomax assaulted one of the security officers and had to be restrained for the safety of himself and the other persons at the scene.

During the restraint process, Mr. Lomax exhibited significant resistance and received multiple TASER X26 drive stuns to the left posterior cervical/shoulder area to encourage

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behavioral change through this pain compliance technique. The particular area that has been indicated in videographed statements by LVMPD Officer Reggie Rader is that of the trapezius muscle. (Note that Officer Rader indicates the right trapezius muscle in the video although the correct side would be the left.) These drive stuns were for a total of 31 seconds over a 9 minute and 55 second time period. The drive stuns applied ranged from a possible minimum of 2 seconds and a possible maximum of 8 seconds. The downloaded data from the ECD indicates discharge time only and does not indicate if these discharges were in contact with Mr. Lomax for the entire recorded time. The possible maximal 8 second application did not occur as a terminal application to Mr. Lomax.

Mr. Lomax continued to significantly struggle and resist which required the assistance of numerous personnel at the scene, including EMS personnel. Because of this continued significant resistance, further drive stuns were applied. It was noted by several personnel at the scene that after the first 6 drive stun applications, Mr. Lomax was breathing and continuing to actively resist the personnel that were there to help him. At some time after the 7th drive stun, Mr. Lomax was noted to be unresponsive and in cardiorespiratory arrest. Testimony by Officer Rader indicates that the condition of respiratory arrest did not occur immediately following the 7th drive stun. In fact, testimony by EMS personnel (Pearson and Ritz) indicates that after the 7th drive stun, Mr. Lomax continued to breathe, have a palpable pulse and remained combative during preparations for transport to the hospital which took a fair amount of time due to the ambulance position some distance away. The 7th drive stun was applied outside of the ambulance per Officer Rader's

testimony and the EMS personnel stated that Mr. Lomax continued to have a pulse, respirations and signs of struggle until within the ambulance. Mr. Lomax underwent immediate resuscitation and was eventually successfully resuscitated but never regained neurologic function.

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Mr. Lomax eventually was declared dead after a stay in the hospital. At autopsy, cause of death was found to be cardiac arrest during restraining procedures with PCP intoxication and bronchopneumonia listed as significant contributing factors.

Opinion

In the unfortunate case of Mr. Lomax, it is also important to address the logic of the situation before getting into the specific physiologic consequences. The issue to consider is whether or not inappropriate logic is being utilized when examining a possible association between ECD use and the sudden death (SD) event. Because the SD event followed shortly after an ECD was used, it is tempting to draw an association between the two simply because of their close association by time sequence. This concept is known as *post hoc, ergo propter hoc* ("after this, therefore because of this").

A simple but obvious example of post hoc, ergo propter hoc logic would be when roosters crow in the morning - shortly after the rooster crows, the sun rises. Using post hoc, ergo propter hoc logic would lead one to believe that the two events described are related because they occur close together in time. The two events are obviously not related and if the rooster doesn't crow the sun still rises. The problem with making

simple time associations as the basis for one's logic is that time associations do not really establish causation. In order to do so, you need to consider other factors such as the probability of chance, the inherent diurnal nature of roosters which causes them to crow in the morning and the fact that the sun will rise every morning because of the laws of the solar system. After considering these other factors, it is clear that the crowing of the rooster and the rising of the sun are not causally related at all.

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This concept of inappropriate logic cannot be overstated. This is the exact reason why so many people unjustifiably believe that ECD use and SD events are related. This applies not only to laypersons but also to educated professionals such as police officers, city officials, attorneys and physicians. It is very easy to make these associations when events or concepts are not easily understood. In fact, the concept of flawed logic as it relates to ICD events has been pointed out in the past.[1] ECDs and SD are not easily understood concepts and therefore tend to be at high risk for misunderstanding and inappropriate logic.

A. Effect of TASER ECD on Respiratory Ability

Critics of ECD technology have alleged that interruption of the normal respiratory process is a possible effect from application of ECDs to human subjects. To date, I am the sole researcher that has brought forth information in this area. When my research on TASER ECDs started a few years ago, it centered around the thought that if ECDs were to contribute to causing a death, then it was likely due to creation of an abnormal cardiac rhythm. One of my first studies was to expose persons to prolonged TASER ECD

applications while conducting a direct ultrasonic view of the heart to look for evidence of this abnormal rhythm generation in real time. These exposures were videotaped.** Because we were so focused on looking at the heart motion on the ultrasound monitor what we failed to realize was that during all of these exposures, the volunteer subject was making vocal noises. We have reviewed these videotapes many times and noted this clue about 2 years ago and realized that this was indirect evidence that our subjects were able to breathe during these exposures.

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This led us to realize that we needed to measure respiratory ability during ECD exposure more accurately. Since then, we have utilized a breath-by-breath analysis machine during prolonged exposures from TASER ECD's. Our results have been uniformly consistent across numerous applications. This has yielded a manuscript that has just been published.[2] The findings in this study clearly show that not only do human subjects exhibit the ability to breathe during ECD application but it is faster and deeper than at baseline. This study was conducted with ECD electrodes applied to various areas of the thorax, always encompassing the muscles of respiration including the diaphragm and were checked in both front and back applications. Furthermore, this study evaluated exposures to prolonged applications in 2 different methods: Continuous for 15 seconds or Intermittent for 15 seconds in 5 second bursts with 1 second rest periods.

I am aware that plaintiff's experts in the Lomax case believe that because the drive stuns were applied in close proximity to the neck region of Mr. Lomax that the phrenic nerve (responsible for diaphragmatic control) and the brainstem respiratory center may have

somehow been incapacitated during these drive stuns causing Mr. Lomax to asphyxiate.[3] I am also aware that plaintiff's experts believe that TASER device application prevented any ability for hyperventilation which would have led to worsening of Mr. Lomax's condition.[4] [5] I would disagree with these for the following reasons:

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1. In a drive stun mode, the TASER device has an effective field of only about 2 inches (the area between the 2 electrodes). We also know that electricity follows the path of least resistance. To do otherwise would violate the known laws of physics. We also know that in this case, all witnesses have agreed that the TASER device was applied to Mr. Lomax's trapezial/neck area on the posterior aspect. The phrenic nerve is an anterior structure in the neck. (FIGURE 1) Given the proximity of the electrodes and the known laws of physics, it is highly improbable if not impossible for the drive stun current to have somehow made its way around to the other side of the neck to affect the area where the phrenic nerve is insulated by muscular structures. I understand Dr. Rhodes to postulate that this could occur by way of the electrical current traveling down nerve fibers to the phrenic nerve. Again, I find this highly improbable if not impossible since the phrenic nerve travels directly into the chest and abdomen and does not give off any known superficial nerve fibers to any structures in the neck or trapezius region. For Dr. Rhodes to opine that this occurred is not consistent with any known medical or anatomical explanation and amounts simply to an untested and unsupported hypothetical.

Additionally, Dr. Rhodes' opinion is that the TASER application was only millimeters away from the respiratory control center in the brainstem known as the medulla

oblongata. Anatomically, this is not correct. (FIGURE 2) Dr. Rhodes again opines that the TASER application to the trapezius area of Mr. Lomax somehow traveled up nerve fibers to this respiratory center and caused his respiratory arrest. Again, for Dr. Rhodes to opine that this occurred is not consistent with any known medical or anatomical explanation and amounts simply to an untested and unsupported hypothetical. I would point out that TASER International teaches the drive stun application to this exact area on a regular basis. To date, their reported database of volunteer exposures in training number over 100,000.[6] While not all of these are drive stun exposures to this particular area, a significant number of them are. There have been no reported asphyxial complications from these to support Dr. Rhodes' opinion.

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2. In my published work on respiratory ability during TASER exposure, the very nature of capturing the phrenic nerve was studied.[2] Contrary to plaintiff's expert assertions[7], this study has direct applicability. Dr. Rhodes' opinion is that this study was irrelevant because the intent was to involve the diaphragm directly. This is not correct. The study that Dr. Rhodes cites was designed to capture all significant structures associated with respiration including the phrenic nerve, the diaphragm and the intercostals muscles and nerves. All of these structures are used during respiration and are, in fact, the primary structures used for respiration.[8] It is important to point out that the phrenic nerve runs from the neck and down through the inner wall of the chest on its way to innervate the diaphragm. The study in question placed TASER electrodes in many different positions to capture all of these areas and the study was unable to demonstrate any evidence of respiratory compromise. In fact, it demonstrated increased ability to breathe during

TASER exposure from a volume and rate standpoint. If we dissect Dr. Rhodes' opinion further, it is based upon asphyxiation from phrenic nerve incapacitation. Even if this were possible, it does not explain why the intercostal component of respiration would have been affected.

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3. Dr. Woodard's opinion simply has no foundation. First, the drive stun application of TASER to Mr. Lomax was a very localized application. Dr. Woodard's opinion was that this localized application of the TASER would have caused "forced muscular contractions and interfere with compensatory hyperventilation. . .". The only significant muscle in the area of the drive stun application was the left trapezius. I would agree that local application of the TASER device to the left trapezius would have likely resulted in some forced contraction of this muscle. However, this muscle is not used as a significant muscle of respiration. The primary function of the trapezius is to allow for shoulder mobility and not respiration.[9]

4. Dr. Strote's respiratory compromise opinion also lacks credible foundation. Dr. Strote's background with TASER device research is limited to a retrospective review of a convenience case series sample.[10] While this research is interesting, it is simply a description of some factors that are present in persons who have died shortly after TASER device application. By Dr. Strote's own admission, the interpretation of this data is limited, causality cannot be established, and there is significant risk for bias of data. Dr. Strote cannot base his opinion of respiratory compromise on his previous research since it does not examine this theory nor on his experience since he has not performed

known work in this area. Dr. Strote makes the same argument that Dr. Woodard does and my evaluation remains the same. I am having difficulty understanding how a drive stun applied to the left trapezius muscle (which is not primarily involved in respiration) can be theorized to cause respiratory compromise when prospective, ECD human research looking at much more comprehensive involvement of the respiratory muscles have not been able to demonstrate this.[2]

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5. Additionally, I have been involved in a previous custodial death case as an expert where plaintiff's allegations specifically centered around a TASER device application involving multiple exposures which were hypothesized to cause suffocation by plaintiffs and their experts.[11] Based on the specifics of this case, we reconstructed the exact placement of electrodes and the exact firing sequence and duration of times for the ECD application in this case while measuring for respiratory ability. We did this on 2 different volunteers for validation and the results were the same. Both subjects continued to demonstrate faster and deeper respirations during the ECD application.[12] Plaintiffs in this case obviously objected to introduction of this during discovery since it completely undermined their claim. The case was ultimately decided by a jury against plaintiffs.

All of the research described above is unique and is the first of its kind to be performed and reported. Based on this, it is my opinion to a very high degree of medical certainty that TASER ECD applications do not show any evidence of contributing to respiratory impairment in humans.

FIGURE 1: Anatomic depiction of the Phrenic Nerve (10) in the human neck demonstrating its anterior position which is well away from and insulated from the area of drive stun application on Mr. Lomax.

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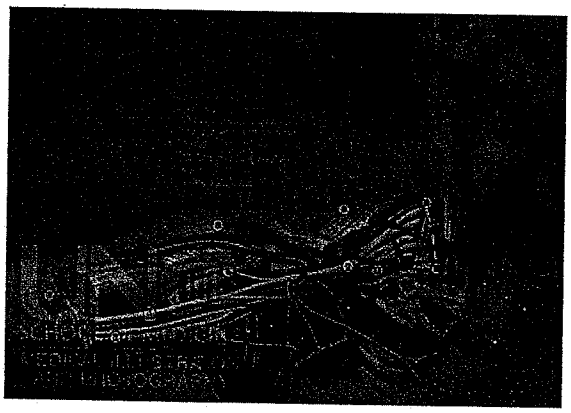
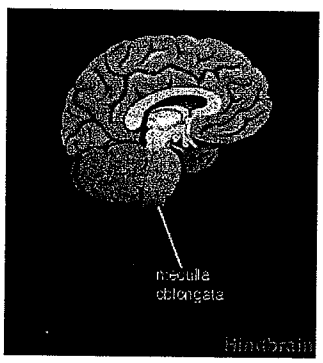


FIGURE 2: Anatomic depiction of the Medulla Oblongata demonstrating its position which is well away from the indicated areas of drive stun application on Mr. Lomax.



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B. Effect of a TASER ECD on Human Blood Chemistry

In addition to respiratory compromise, another theory that has been put forth by critics of ECD technology is that the application of this to human subjects may somehow cause a dangerous change in the measurable serum physiology. Human life exists within a scope of measurable physiologic parameters. These parameters include certain pH (acid/base balance) and electrolyte (sodium, potassium, chloride, glucose) parameters. These appear to be of concern in Mr. Lomax's case as brought forward by plaintiffs' experts in their reports. In order to simplify this, I will address these individually.

1. pH: This is a measure of the acidity present in the body's blood and tissues at any point in time. It is inversely proportional to the amount of acid present. Therefore, the higher the acid content, the lower the pH. If the acid level becomes too great (pH becomes too low), death can result. A high acid level from elevated metabolism is postulated to play a part in causing some deaths,

especially in those persons exhibiting features of delirious behavior. This has been demonstrated in previous medical literature.[13] Because ECDs are sometimes used on persons with this type of behavior, it has been thought that perhaps ECDs contribute to causing high acid levels. However, this has not been demonstrated in a scientific, peer-reviewed study on humans.[14] The conclusion of this study was that the TASER ECD did not change the acid level of humans in a statistically significant manner. Furthermore, I am in possession of data, that is currently in the peer-review process, examining TASER device application to a population of acidotic human volunteers.[15] This data is quite applicable to this case since it compares pH effect of prolonged ECD application on a pool of acidotic humans against a sham control group. The summary conclusion of this study based on this data is that prolonged ECD exposure has little effect in worsening already-present acidosis in humans.

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2. Electrolytes: Human tissue and blood is bathed in fluid full of electrolytes and other substances. The presence of these is necessary for normal life functions. These electrolytes and other substances are comprised of elements and compounds such as sodium, potassium, chloride and glucose. In evaluating people for health care concerns, it is very common for a doctor to check these substances with routine blood tests since any abnormal levels of these substances can lead to significant health problems including death. These electrolytes and other substances exist in differing concentrations within individual cells in the body, as well as in the blood stream. It has been

> postulated by some that exposure to an ECD can damage cells at the microscopic level causing them to leak out some of these substances which could dangerously elevate their levels in the blood. However, this has not been demonstrated in a scientific, peer-reviewed study on humans.[14] The conclusion of this study is that the TASER ECD did not change the levels of these electrolytes or other substances in humans in a statistically significant manner.

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In the case of Mr. Lomax, plaintiffs' expert Dr. Strote has opined that recent studies involving repeated TASER exposures suggest that metabolic derangements including significant acidosis can occur. This is misleading as it does not discuss any details. Dr. Strote states that there are recent "studies" but cites only a single study.[16] What Dr. Strote fails to discuss in his opinion is that there are some major dissimilarities between the study he references and the case of Mr. Lomax and it would be nearly impossible to draw any sort of comparative conclusions. First, the study was done with a non-human model (specifically pigs). Second, the study was done on animals that were under the influence of a general anesthesia protocol which is very much contrary to the situation that Mr. Lomax was in during the time period in question. In fact, the author of the study that Dr. Strote cites personally warns against the many limitations of the study.[17] These limitations include: "some anesthetics may have adverse effects on respiration"; conditions of this experiment were "extreme compared with those commonly experienced during civilian law-enforcement use"; and that "it would not be prudent to draw conclusions about such use on the basis of" his first published study alone. Jauchem (the

author of the referenced study) also noted that "the degree of lactate increase was similar to that in other studies of pigs performing exhaustive exercise and of humans working for short periods." The point of this is that the lead author of this study is very quick to point out the limitations of using this single study to base significant conclusions upon. And, I would agree. Therefore, I cannot agree with Dr. Strote's opinion which is based upon the Jauchem study.

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I do agree with Dr. Strote about the high risk of sudden death to Mr. Lomax. His obesity, underlying cardiac fibrosis found at autopsy, PCP use, and continued agitation and struggle all significantly contributed. However, Dr. Strote and I clearly disagree on the role of the TASER device in this encounter. Dr. Strote bases his cardiac arrest opinion on a plethora of human studies but then deviates from this and cites a single pig study on which to base his TASER device opinion despite there being human studies done in this specific subject area.

Based on all of the above human research, there is no evidence to suggest that ECD application causes any concerning abnormalities in human serum physiology or acid/base status that is detectable by conventional medical diagnostics.

Conclusions

Based on my review of the totality of the documentation listed above, as well as my professional education, experience and background, it is my opinion, to a reasonable

degree of medical probability, that the use of the TASER ECDs did not cause or contribute to Mr. Lomax's death.

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It is also my opinion, to a reasonable degree of medical probability, that the factors of illicit drug intoxication, continued delirious behavior and underlying bronchopneumonia directly contributed to Mr. Lomax's death and his inability to survive the cascade of events following his initial resuscitation.

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[1] Farnham FR and HG Kennedy. Acute excited states and sudden death: much journalism, little evidence. *Br Med J*, 1997;315:1107-8.
[2] Ho JD, et al. Respiratory Effect of Prolonged Electrical Weapon Application on Human Volunteers. *Acad Emerg Med*, 2007;14:197-201.
[3] Plaintiff Expert report by Dr. Mark Rhodes, Opinion #11, March 20, 2007.
[4] Plaintiff Expert report by Dr. Brett Woodard, page 2.
[5] Plaintiff Expert report by Dr. Jared Strote, Opinion #5, March 20, 2007.
[6] Anonymous. "TASER training video and information disk, version 13." TASER International, April, 2006.
[7] Plaintiff Expert report by Dr. Mark Rhodes, Opinion #13, March 20, 2007.
[8] Levitsky MG. Pulmonary physiology, 6th edition. McGraw Hill publishing, New York, 2003.
[9] http://www.fitstep.com/Advanced/Anatomy/Back.htm
[10] Strote J and HR Hutson. Taser use in restraint-related deaths. *Prehosp Emerg Care*, 2006;10:447-449.
[11] Alvarado v. City of Los Angeles, et al. CV 04-0385 TJH.
[12] **Alvarado Exposure reproduction data in possession of Dr. Jeffrey Ho. Performed 10/2006 at TASER International Research Laboratory, Scottsdale, AZ.
[13] Hick JL, et al. Metabolic acidosis in restraint-associated cardiac arrest: a case series. *Acad Emerg Med*, 1999;6:239-43.
[14] Ho JD, et al. Cardiovascular and physiologic effects of conducted electrical weapon discharge in resting adults. *Acad Emerg Med*, 2006;13:589-595.
[15] **Ho JD, et al. Cardiovascular and physiologic effects of prolonged conducted electrical weapon discharge on exhausted adults. Data in possession of Dr. Jeffrey Ho, currently under peer review for publication.
[16] Jauchem, et al. Acidosis, lactate, electrolytes, muscle enzymes and other factors in the blood of sus scrofa following repeated TASER exposures. *For Sci Intl*, 2006;161:20-30.
[17] Jauchem JR. Re: Acidosis, lactate, electrolytes, muscle enzymes, and other factors in the blood of Sus scrofa following repeated TASER exposures [reply to letter to the editor]. *For Sci Intl*, 2007.

**Unpublished research, documents, data and video will only be produced pursuant to a protective order.

June 25, 2007

Case: LaKisha Neal-Lomax, et al. v. Las Vegas Metropolitan Police Department, et al.; Case # 2:05-cv-1464-PMP-RJJ

Addendum Expert Report by Jeffrey D. Ho, MD

I have been asked to provide an addendum to my expert report by the Barnes and Thornburg, LLP law firm in this case. Specifically, I have been asked to perform the following assignments:

1. Review declarations of security officers James Hines and Bryan Cornell and give opinion on these.

2. Review the deposition of Dr. Knoblock and give opinion on this.

3. Review the supplemental report from Dr. Strote and give opinion on this.

4. Review the document "Responses to Defense's Expert Reports Submitted in Lomax v TASER Case" by Dr. Strote and give opinion on this.

I have been provided with and have reviewed the following documents for this addendum:

1. Declarations of security officers James Hines and Bryan Cornell

2. Deposition of Dr. Knoblock

3. Supplemental report from Dr. Strote

4. A document entitled "Responses to Defense's Expert Reports Submitted in Lomax v TASER Case" by Dr. Strote.

* I reserve the right to supplement or modify this statement if and when I acquire additional relevant information prior to the time of trial.

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Review of Declarations of Security Officers Hines and Cornell

The declarations of these 2 officers are helpful in establishing a better timeline of events. Both declarations appear to validate a similar approximate timeline. The significance of this timeline is that it demonstrates a period of several minutes that elapse from the time of the last TASER device application to Mr. Lomax and the point at which he is discovered to be in cardiopulmonary arrest. There is an approximate 5 minute time period outside of the ambulance after the last ECD application, and an approximate 7 minute time period inside of the ambulance.[1] [2] During this collective time period of several minutes, there is establishment of a pulse and respirations on the part of Mr. Lomax through the indirect evidence of his continued combativeness. Just prior to his cardiopulmonary collapse, it has been established that a family member had to tell Mr. Lomax to "shut up" repeatedly due to his continued agitated nature.[3] [4]

The significance of this timeline establishment is simply to note that the cardiovascular collapse of Mr. Lomax in relation to the last ECD application is relatively remote. This pattern of non-instantaneous collapse during a custodial death situation following use of an intermediate weapon has been described before in previous research.[5] It is important to note that this simple time separation between the last ECD application and Mr. Lomax's collapse demonstrates a non-association between the 2 with a high degree of medical certainty. There is definitive medical literature available that discusses the primary mechanisms of death due to electrical current application.[6] [7] This literature is in agreement that if electrical current is to have a primary causal effect regarding death, the effect is nearly instantaneous. This does not describe the scenario in the case of Mr.

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Lomax. In fact, the mechanisms put forth by plaintiff experts in this case are not supported by either the available medical literature, the known scientific human research, or the established timeline of events.

Finally, the declarations of Officers Hines and Cornell support a quiet period in the ambulance by Mr. Lomax prior to his collapse. This "quiet period" is also consistent with other custodial death cases[8], and is also consistent with my own experience in caring for these types of patients just prior to their collapse. It is notable that in these cases, death occurs regardless of ECD use and is presumed to be due to an underlying condition of agitation or delirium. The exact cause of death from this condition is debatable but the risk factors of drug intoxication and underlying health conditions (of which Mr. Lomax had both) are clear and are recognized as being common factors in these deaths.[9] [10] [11] [12]

Review of Deposition of Dr. Knoblock

After reviewing the excerpts and the deposition of Dr. Knoblock, my opinion in this case remains unchanged. With respect to Dr. Knoblock, I am under the impression that he has very little knowledge of ECDs and what they are and are not capable of. He admitted that he has performed very little in the way of self-education and no personal research on this subject.[13] He also admits that he is unable to support any of his opinions regarding an ECD contribution in this case with medical literature.[14] He also admits that he has no evidence that if an ECD had not been used, Mr. Lomax would still be alive.[15]

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I am also concerned that Dr. Knoblock had no knowledge of an event timeline leading up to the death of Mr. Lomax.[16] As I have explained above in my opinion regarding the declarations of Officers Hines and Cornell, the timing of events is significant in helping understand why the ECD could not have contributed to this death. Since Dr. Knoblock did not have this information at the time of performing the autopsy, it is quite possible that his conclusions and opinions have been made in error.

Finally, I am concerned that Dr. Knoblock is not critical of his own report given the above.[17] In medicine, making conclusions without the benefit of all information is understandable and is often done as a means of practicality. However, it is imperative that the practitioner also be able to recognize that if additional pertinent information comes to light, conclusions should be re-evaluated. Dr. Knoblock has admitted that he is not an ECD expert, has limited understanding of the literature that is available regarding ECDs, has performed minimal self-education of this topic and does not recognize the importance of establishing a timeline of events in this case. It is my impression that Dr. Knoblock's conclusions and opinions are not fully informed which is a possible indication of error.

There is nothing in Dr. Knoblock's deposition that has changed my opinion in this case. Dr. Knoblock has offered up no credible theory as to how an ECD contributed to the death of Mr. Lomax. In fact, Dr. Knoblock has only called into question his previous conclusions based on his knowledge and understanding of an ECD.

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Review of Supplement Report of Dr. Strote

Dr. Strote has submitted a supplemental report after my initial expert report was submitted. Dr. Strote's supplemental report is not dated on the copy provided to me. While no content was deleted from his original report, 4 areas of significant content were added that I have been asked to comment on.

First, Dr. Strote has added language that calls attention to the timing of the apparent collapse of Mr. Lomax. This language is in the first paragraph of page 2. Dr. Strote has added wording that indicates that he is unclear about the exact point of respiratory arrest for Mr. Lomax. I disagree with Dr. Strote on this based on a fairly clear timeline of events established by declarations of 2 eyewitnesses to this event (Hines and Cornell declarations). As described in the first part of my addendum, these declarations clearly demonstrate a lapse of many minutes after the last ECD application to the discovery of Mr. Lomax's cardiopulmonary collapse. According to these witnesses, there is no question that Mr. Lomax continued to have cardiac and respiratory function for several minutes after the last ECD application as evidenced by his continued resistive and agitated behavior.

Secondly, Dr. Strote has added language on page 4, paragraph 5, section a (ii) to insinuate that ECD application created a situation of catecholamine overload. To put this into perspective, it is important to understand what catecholamines are and what they do within the human body. Catecholamines are chemicals that naturally occur within the body and allow us to adapt to stress through regulation of many body functions such as

heart rate, sweating, blood pressure, metabolic regulation, etc. The primary catecholamines found in the human body are epinephrine and norepinepherine which are manufactured in the adrenal glands that sit on top of the kidneys. These substances can also be synthetically manufactured in a laboratory setting and are often used in resuscitation of critically ill persons.[18]

When catecholamines (and other hormones) are released in your body, they allow humans to respond appropriately to stressful situations.[19] Humans undergo some amount of stress on a daily basis and there is always some level of circulating catecholamine to allow us to adapt to this. (Some examples of daily stress would be waking up in the morning from a state of sleep, working under a deadline or commuting in rush hour.) This level of circulating catecholamine is believed to be variable depending on how stressful an individual perceives their certain situation to be and under extreme stress (as in Mr. Lomax's case), maximal levels of catecholamines allow for a "fight or flight" response.[20] Namely, they allow the person experiencing this stress to either take a position of resistance or seek a position that would remove them from the stress. The body functions that catecholamines induce under extreme stress conditions allow the person to continue to maintain a "fight or flight" response in a physiologic effort to limit the potential for damage by the stressor. (An example of this would be an increase in circulating levels of glucose which is used by the body as an immediate source of energy to maintain its current level of activity).

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It is theorized by some that certain stressors could possibly contribute to sudden deaths by causing so much stress that the body produces such a large amount of circulating catecholamine as to cause death.[12] While pain is a known inducer of a stress response[21], the ability for pain (by itself) to cause an immediate response large enough to contribute to sudden death is entirely theoretical. In fact, this theory about pain is not subscribed to by all experts in this field and research data supporting this theory is lacking. A recent human study that is currently in press demonstrates that pain, by itself, produced a confounding change in vital signs with minimal correlation.[22] This is a good example of why pain, as an independent factor, is very unlikely to contribute to causing a sudden death due to catecholamine release. The bottom line is that pain (by itself) as a contributor to sudden death is currently an untested theory and data exists to suggest that it is not.

In direct contradiction to any catecholamine theory is the fact that when a person experiences a sudden death state, one of the first medications indicated to treat this is the synthetic catecholamine epinephrine. Administration of this is the current national standard of medical care in this situation and has been for decades.[18] This standard of care has been peer reviewed many times and scrutinized by numerous researchers and medical experts and it has not changed significantly in well over 20 years. This, by itself, does not support the theory of excess catecholamine response during sudden death circumstances. The reason for this is simple: If the sudden death is theorized to be due to too much circulating catecholamine in the first place, than why is the standard of care throughout the resuscitation to give *more* catecholamine every 3-5 minutes?

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It is also doubtful that the application of an ECD to Mr. Lomax could meaningfully increase the level of circulating catecholamines any more than what they were already at. When the human body reaches a point of perceived extreme stress, it activates what is believed to be a maximal catecholamine release into the system. This initiates the "fight or flight" response. This response is believed to have evolved in humans as a means of survival when confronted by a predator and is an innate or involuntary reflex response.[23] The important thing to note here is that it is a survival reflex. A person cannot control it and it is an all or nothing response. (In other words, you cannot partially activate this reflex. It is either all the way on or all the way off in extreme circumstances) Much of the understanding of this response comes from Dr. Hans Selye's work in the mid 1900s.[24] [25] [26] In the case of Mr. Lomax, it is documented that he had been in some type of agitated state long before any ECD application (the housing officers found him in this state). Within this time period, Mr. Lomax increasingly escalated his behavior to an out-of-control state which included assaulting one of the housing officers and then resisting active attempts to control his behavior. All of this occurred prior to any ECD usage. Within a reasonable degree of medical certainty, it is my opinion that prior to any ECD usage, Mr. Lomax was already at a "fight or flight" reflex response. The descriptions of his agitated and delirious state make it clear that he erroneously perceived his surrounding environment to be a significant threat (likely due to PCP toxicity). Because his response was an all or nothing maximal response at this state of agitation, it is unlikely that any other stressor at this point would be able to significantly alter the maximal catecholamine response that he was already experiencing. (To put this into

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perspective, let's use the example of a tiger chasing you in the jungle with the intent of eating you. This would invoke a maximal catecholamine release and you would most likely attempt to run for your life. If a 2nd tiger suddenly joined in the chase, you would not be able to increase the already maximal catecholamine release.)

A final consideration in my assessment of Dr. Strote's catecholamine opinion is the fact that Mr. Lomax was under the influence of a significant amount of the illicit psychoactive drug phencyclidine (PCP). Previous research indicates that while PCP is not strictly considered to be a stimulant, it does have several side effects that mimic the illicit stimulant class of drugs.[27] It is believed to do so by preventing the reuptake of normally circulating catecholamines and, therefore, allows them to continue to build up inappropriately within a person's body. Since Mr. Lomax was under this influence, it can be concluded that the PCP in his system was already causing a hypercatecholamine physiologic state long before an ECD exposure was introduced into the scenario.

Based on this, I disagree with Dr. Strote's assessment of ECD induced catecholamine surge. Offering this as a possible theory is truly hypothetical and is not consistent with known medical practice or research. It is my opinion based on a reasonable amount of medical certainty that the catecholamine excess that Mr. Lomax was experiencing during this entire event was present well before any ECD application and was certainly independent of that action.

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The third area that needs to be addressed in Dr. Strote's supplemental report is found on the 4th page, paragraph 5, section b (i). Dr. Strote calls into question my research credibility based on the fact that the research was partially funded by ECD manufacturer TASER International. I would like to call to his attention that the very fact that this potential conflict was disclosed indicates my willingness to be scrutinized by the peer-review scientific process. In actuality, I have met many times with my research oversight board at my institution and have satisfied all potential conflict matters to their satisfaction. The process in place for this involves all of my sponsored research and requires that I have a disinterested statistician involved in the research process from start to finish. This person has direct control of all data so that it cannot be manipulated by me, the sponsor, or any other participants. This arrangement has been deemed appropriate for management of this conflict by my research foundation as well as the scientific peer-review process.

While I agree with Dr. Strote that the perception of conflict can call into question the credibility of research findings, I also call attention to the conclusions of all of my research which encourages further studies to validate my findings. In fact, an independent group of researchers is doing just that and has begun to present their findings from studies that replicate mine which is further evidence of the credibility of the original data.[28] [29] [30] The fact that their findings mimic mine should put Dr. Strote's mind at ease regarding this issue.

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Review of Dr. Strote's "Responses to Defense's Expert Reports" Document

I have been provided with a copy of this document that is undated and I have been asked to comment on the section "Selected Responses to Jeffrey Ho" which is found on page 9. In this document, Dr. Strote is critical of my human ECD research because it did not exactly mimic the scenario that Mr. Lomax was in. This is an easy intellectual criticism to make since I'm sure that Dr. Strote realizes that it would be unethical to perform a research study with the exact illegal conditions present in the Lomax case. Simply stating that the research study is not comparable, however, misses the point of using research for comparative analysis. In the studies that Dr. Strote has reviewed and commented on, it is very important to point out that there was not even a hint of concerning physiologic compromise during the 15 second exposures. Had there been any sort of detectable change in any of the measured data suggesting a problem, I would be the first to agree that there would need to be further study to elucidate what trend was beginning to occur. In these studies, there was no evidence of this trend. This includes respiratory compromise as well as worrisome metabolic derangement.

At this point, I am only aware of plaintiff's expert criticism directed towards my research done in this subject area. I am not aware of any human research brought forth by the plaintiff's experts in this case (done by themselves or others) which would directly contradict my research findings. It would be very helpful for Dr. Strote to base his opinion on such instead of simply criticizing known and existing science in a reactionary fashion.

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Finally, in this document, Dr. Strote continues to bring my research credibility into question due to its partial source of funding. I have responded to this concern above, hopefully to his satisfaction since it has satisfied every peer group that has reviewed it. I have also provided evidence that current independent groups have that mimic my research findings. I view this as validation of my work and hope that he would do the same.

Conclusion

Based on the declarations of Officers Hines and Cornell, the deposition of Dr. Knoblock and the supplemental and "response" reports of Dr. Strote, my original opinion remains unchanged. Based on my review of the documentation listed above, as well as my professional education, experience and background, it is my opinion, to a reasonable degree of medical probability, that the use of the TASER ECD did not cause or contribute to Mr. Lomax's death.

It is also my opinion, to a reasonable degree of medical probability, that the factors of illicit drug intoxication, continued delirious behavior, and underlying bronchopneumonia directly contributed to Mr. Lomax's death and his inability to survive the cascade of events following his initial resuscitation.

Jeffrey D. Ho, MD, FACEP
June 26, 2007

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[1] Declaration of James Hines, May 30, 2007. Page 5, lines 14-24 and page 6, lines 5-9.
[2] Declaration of Bryan Cornell, May 23, 2007. Page 3, lines 21-22; Page 4, lines 19-21 and page 5, lines 9-12.
[3] Declaration of James Hines, May 30, 2007. Page 6, lines 1-2.
[4] Declaration of Bryan Cornell, May 23, 2007. Page 5, lines 2-6.
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[13] Deposition of Dr. Knoblock, May 14, 2007. Page 86, lines 3-24.
[14] Deposition of Dr. Knoblock, May 14, 2007. Page 118, lines 16-22.
[15] Deposition of Dr. Knoblock, May 14, 2007. Page 86, line 25 through page 87, line 17.
[16] Deposition of Dr. Knoblock, May 14, 2007. Page 90, line 7 through page 93, line 24.
[17] Deposition of Dr. Knoblock, May 14, 2007. Page 101, lines 9-11.
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July 13, 2007
Addendum Experts Report

Case: A513602
LaKisha Neal-Lomax, et al. v. Las Vegas Metropolitan Police Department, et al.

As expert medical witnesses in this matter, we have become aware of new information that we believe has a direct bearing on this case and we are making this information available in this expert report.

We are aware that plaintiffs' experts have opined that because Mr. Lomax received drive stuns from a TASER® device that were in close proximity to his neck region that the phrenic nerve (responsible for diaphragmatic control) and the brainstem respiratory center may have somehow been incapacitated during these drive stuns causing Mr. Lomax to asphyxiate.[1] We are also aware that plaintiffs' experts believe that the TASER device application prevented any ability for hyperventilation which would have led to worsening of Mr. Lomax's condition.[2,3]

On July 9-13, 2007, we were involved in a collective effort to continue our research work on TASER devices. This work took place at a TASER Master Instructor Conference/School in Chicago, IL. During this time period, we examined numerous human subjects under various experimental protocols who received TASER device applications. One of the experimental protocols involved 10 second drive stun applications to the area of the neck/trapezius, effectively reproducing the application

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technique and location that were used on Mr. Lomax on the night of his death. In addition to this, we utilized a portable ultrasound machine (Sonosite MicroMaxx with a P17/5-1MHz probe) to visualize the diaphragm and hearts of the study subjects during their exposure. In 5 study subjects, we visualized their diaphragms and all had normal diaphragmatic movement during TASER device drive stun exposure which is a direct demonstration of respiration occurring during this drive stun application. We have videographed these applications and have recorded moving images of the ultrasound results.[4] The images are available for review under the terms of the protective order. There was no evidence of impaired respiration in any of these study subjects.

We collectively agree that this data can only be interpreted one way: There is no impairment of respiration from a TASER device drive stun application to the area of the neck/trapezius. Our demonstration of this is based on clear and convincing scientific evidence gleaned from direct human study. We observed these findings individually and we each came to the same conclusion: these findings effectively invalidate the claim of the plaintiffs' experts in this case. We further assert that these claims by the plaintiffs' experts have not been based on anything other than speculation.

Conclusion:

We collectively agree that we are in possession of direct evidence demonstrating that a TASER device drive stun application to the posterior region of the human neck does not impair or stop respirations. It is our collective opinion that this evidence is clear and convincing with regard to demonstrating a lack of understanding of TASER device

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function and capability on the part of the plaintiffs' experts in this case. It is also our collective opinion, to a reasonable degree of medical certainty, that the use of the TASER ECDs did not cause or contribute to Mr. Lomax's death and that the factors of illicit drug intoxication, continued delirious behavior and underlying bronchopneumonia directly contributed to Mr. Lomax's death and his inability to survive the cascade of events following his initial resuscitation.

Jeffrey Ho, M.D.

Donald Dawes, M.D.

James Miner, M.D.

[1] Plaintiff Expert report by Dr. Mark Rhodes, Opinion #11, March 20, 2007.
[2] Plaintiff Expert report by Dr. Brett Woodard, page 2.
[3] Plaintiff Expert report by Dr. Jared Strote, Opinion #5, March 20, 2007.
[4] Real time ultrasonographic and video images of 5 human subject diaphragms during drive stun TASER device exposure to the trapezius. Collected at the TASER Tactical Conference and Master Instructor School, July 9-13, 2007, Chicago, IL.

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